

What is claimed is:

(1) An active electronic device, comprising:  
a carbon nanotube;  
a first electrode connected to one end of the carbon nanotube;  
a second electrode connected to the other end of the carbon nanotube; and

a third electrode facing the carbon nanotube to irradiate the carbon nanotube with electromagnetic waves,

wherein the amount of current flowing into the carbon nanotube is changed by electromagnetic waves, at least high frequency electromagnetic waves, radiated from the third electrode onto the carbon nanotube.

(2) An active electronic device according to claim 1, wherein the carbon nanotube has metallic properties.

(3) An active electronic device according to claim 1, wherein the first electrode and the second electrode are formed on the front surface of a substrate, and the third electrode is formed on one of the front surface and rear surface of the substrate.

(4) An active electronic device according to claim 1, wherein the amount of current flowing into the carbon nanotube is changed by using high frequency electromagnetic waves radiated from the

third electrode to make the amount of current flowing into the carbon nanotube larger than the case when the carbon naotube is not irradiated with any electromagnetic wave.

(5) An active electronic device according to claim 1, wherein the carbon nanotube is a multi wall carbon nanotube.

(6) An active electronic device according to claim 1, wherein the length of the carbon nanotube is within the range of equal to or more than 1 nm and equal to or less than 100  $\mu\text{m}$ .

(7) An active electronic device according to claim 1, wherein the first, second, and third electrodes are respectively formed of a material selected from the group consisting of Au, Pt, Ag, and Si.

(8) An active electronic device according to claim 2, wherein a specific inductive capacity of the substrate is 1 or more and 100 or less.

(9) An active electronic device according to claim 2, wherein the substrate is an insulator that contains a material selected from the group consisting of silicon oxide, titanium oxide, aluminum oxide, and silicon nitride.

(10) An electronic apparatus, comprising:

an active electronic device including: a carbon nanotube; a first electrode connected to one end of the carbon nanotube; a second electrode connected to the other end of the carbon nanotube; and a third electrode placed near the carbon nanotube to irradiate the carbon nanotube with electromagnetic waves; and

a driver circuit for causing the third electrode to output at least high frequency electromagnetic